

Applicants: Zhou et al.
Serial No.: 10/721,376
Filing Date: November 25, 2003
Docket No.: VIM-003

Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application. Claims 11-15 have been added.

Listing of Claims

1. (currently amended) A method of generating missing pixels to fill in interline gaps in a field of pixels of video information, the method comprising:

(a) determining whether pixels surrounding a missing pixel exhibit a predetermined gradient characteristic, and if the surrounding pixels exhibit the predetermined gradient ~~characteristic~~characteristic then storing a first missing pixel gradient value associated with the missing pixel, whereas if the pixels surrounding the missing pixel do not exhibit the predetermined gradient characteristic then storing a second missing pixel gradient value associated with the missing pixel;

(b) repeating step (a) for each of a plurality of missing pixels of a block of missing pixels and thereby generating a plurality of missing pixel gradient values;

(c) examining the plurality of missing pixel gradient values generated in (a) and (b) and determining whether a first predetermined pattern of missing pixel gradient values exists in the plurality of missing pixels, the first predetermined pattern of missing pixel gradient values being indicative of a first tilt gradient condition;

(d) if the first predetermined pattern of missing pixel gradient values is determined to exist in (c) then applying a first tilt spatial interpolation method to generate each of the missing pixels of the block of missing pixels;

(e) if the first predetermined pattern of missing pixel gradient value is not determined to exist in (c) then examining the plurality of missing pixel gradient values generated in (a) and (b) and determining whether a second predetermined pattern of missing pixel gradient values exists in the plurality of

Applicants: Zhou et al.
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Docket No.: VIM-003

missing pixels, the second predetermined pattern of missing pixel gradient values being indicative of a ~~second~~second tilt gradient condition; and

(f) if the second predetermined pattern of missing pixel gradient values is determined to exist in (e) then applying a second tilt spatial interpolation method to generate each of the missing pixels of the block of missing pixels.

2. (original) The method of Claim 1, wherein the plurality of missing pixel gradient values examined in (c) includes at least three missing pixel gradient values but less than fifteen missing pixel gradient values, and wherein the plurality of missing pixel gradient values examined in (e) includes at least three missing pixel gradient values but less than fifteen missing pixel gradient values.

3. (original) The method of Claim 1, wherein the first tilt spatial interpolation method is a left tilt spatial interpolation method, and wherein the second tilt spatial interpolation method is a right tilt spatial interpolation method.

4. (original) The method of Claim 1, further comprising:

(g) before step (a) determining whether a block of said pixels of video information exhibits a motion characteristic; and

(h) if neither the first predetermined pattern is determined to exist in step (c) nor the second predetermined pattern is determined to exist in step (e), and if the block of pixels is determined in step (g) to exhibit the motion characteristic, then applying a high angle spatial interpolation method to generate each of the missing pixels of the block of missing pixels.

5. (original) The method of Claim 1, wherein the first tilt spatial interpolation method uses more than two rows of pixels of the field, and wherein the second tilt spatial interpolation method uses more than two rows of pixels of the field.

Applicants: Zhou et al.
Serial No.: 10/721,376
Filing Date: November 25, 2003
Docket No.: VIM-003

6. (original) The method of Claim 1, wherein the determining of (a) involves using at least three pixel luminance values from pixels in a first row of pixels of the field and also involves using at least three pixel luminance values from pixels in a second row of pixels of the field, and wherein the missing pixel is to fill in an interline pixel gap between the first row of pixels and the second row of pixels.

7. (canceled)

8. (currently amended) The method of Claim 7, A method of generating missing pixels to fill in interline gaps in a field of pixels of video information, the method comprising:

(a) using temporal interpolation to generate a first plurality of the missing pixels;
(b) using a high angle spatial interpolation method to generate a second plurality of the missing pixels, wherein the high angle spatial interpolation method uses a number A of the pixels of video information to generate a missing pixel; and

(c) using a low angle spatial interpolation method to generate a third plurality of the missing pixels, wherein the low angle spatial interpolation method uses a number B of the pixels of video information to generate a missing pixel, wherein B is greater than A, and wherein the low angle spatial interpolation method involves:

(c1) generating a block of gradient pixel values; and
(c2) examining the block of gradient pixel values and determining whether either a left tilt gradient condition or a right tilt gradient condition is exhibited by the block of gradient pixel values, wherein if the left tilt gradient condition is exhibited then performing a left tilt low angle spatial interpolation method to generate the third plurality of missing pixels, and wherein if the right tilt gradient condition is exhibited then performing a right tilt low angle spatial interpolation method to generate the third plurality of missing pixels.

Applicants: Zhou et al.
Serial No.: 10/721,376
Filing Date: November 25, 2003
Docket No.: VIM-003

9. (original) The method of Claim 8, further comprising:

determining whether a block of said pixels of said field exhibits a motion characteristic, wherein if the block is determined not to exhibit the motion characteristic then using the temporal interpolation of step (a) to generate missing pixels to fill interline gaps in the block, and wherein if the block is determined to exhibit the motion characteristic then using either the high angle spatial interpolation method of step (b) or the low angle spatial interpolation method of step (c) to generate missing pixels to fill the interline gaps in the block.

10. (original) The method of Claim 9, wherein high angle spatial interpolation is performed to generate interline gap pixels for the block if the block exhibits the motion characteristic and if neither the left tilt gradient condition is exhibited in step (c2) nor if the right tilt gradient condition is exhibited in step (c2).

11. (new) The method of Claim 1, further comprising:

(g) if neither the first predetermined pattern is determined to exist in step (c) nor the second predetermined pattern is determined to exist in step (e), then applying a low angle spatial interpolation method to generate each of the missing pixels of the block of missing pixels.

12. (new) The method of Claim 1, wherein the block of missing pixels has a dimension of fewer than twenty-four pixels by fewer than seven pixels.

13. (new) The method of Claim 8, wherein the left tilt low angle spatial interpolation method is a left tilt luminance low angle spatial interpolation method, and wherein the right tilt low angle spatial interpolation method is a right tilt luminance low angle spatial interpolation method.

Applicants: Zhou et al.
Serial No.: 10/721,376
Filing Date: November 25, 2003
Docket No.: VIM-003

14. (new) The method of Claim 8, wherein the left tilt low angle spatial interpolation method is a left tilt chrominance low angle spatial interpolation method, and wherein the right tilt low angle spatial interpolation method is a right tilt chrominance low angle spatial interpolation method.

15. (new) The method of Claim 9, wherein high angle spatial interpolation is performed to generate interline gap pixels for the block if the block exhibits the motion characteristic and if there are less than two lines of pixels either above or below the interline gap pixels that are to be filled in.